# ATTACHMENT C

## Amendments to the Claims

*This listing of claims will replace all prior versions, and listings, of claims in the application.*

1. (currently amended) A reciprocating engine ~~used~~ operating between a minimum speed of rotation Nmin and a maximum speed Nmax comprising:~~, which comprises~~

a turbocharging unit ~~(2) dimensioned so as to function autonomously when~~which:

- ~~it~~ supplies ~~the~~ an intake manifold ~~(8)~~ of the engine with compressed air via a cooler;
- ~~it~~ is supplied with gas by ~~the~~ an exhaust manifold ~~(9, CR and CT)~~ of the engine at the exhaust temperature; and
- has a ~~the~~ turbine ~~supply~~ inlet pressure ~~(P3) is~~ substantially equal to ~~the~~ a compressor discharge pressure ~~(P2)~~;~~,~~

in such a way that at constant air temperature and with a fixed geometry, the turbocharging unit delivers a substantially constant volume of cooled air Vc when the compressor discharge pressure varies,

and that the volume Vc is substantially proportional to ~~the~~ a turbine inlet section ~~Sd~~ offered to ~~the~~ hot gases,

wherein the turbine inlet pressure ~~(P3)~~ is maintained substantially equal to the compressor discharge pressure ~~(P2)~~ by a EGR bypass ~~(3)~~ provided between the intake manifold ~~(8)~~ and ~~the~~ an exhaust manifold ~~(9)~~ dimensioned ~~so as~~ to transfer ~~the~~ a flow of exhaust gas to the intake manifold without significant loss of pressure,

and wherein the volume of air Vc is less than the volume drawn in by the engine at the speed Nmax ~~in~~ such ~~a way~~ that a flow of hot gases is drawn in again by the engine via the EGR bypass ~~(3)~~ above ~~the speed Na, known as the~~a turbocharging adaptation speed Na, where the volume drawn in is equal to volume Vc, and a flow of air is deflected towards the turbine below the adaptation speed Na.

2. (currently amended) A reciprocating engine as claimed in Claim 1, wherein the EGR bypass ~~(3)~~ has an EGR valve ~~(6) making it possible~~ to increase the turbine inlet pressure above the compressor discharge pressure.

3. (currently amended) A reciprocating engine as claimed in Claim 1, wherein the turbocharging unit has an intake valve ~~(7)~~ situated on ~~the~~ a compressed air discharge conduit ~~making it possible~~ to increase the compressor discharge pressure above the turbine inlet pressure.

4. (currently amended) A reciprocating engine as claimed in Claim 1, wherein the EGR bypass ~~conduit (3)~~ has a gas cooler ~~(4) at an adjustable temperature, preferably~~ adjustable to cool gas up to a temperature close to that of ~~the~~ fresh air.

5. (currently amended) A reciprocating engine as claimed in Claim 4, wherein the adjustment of the temperature is effected by controlling a bypass of the cooler.

6. (currently amended) A method of supplying a~~n~~ reciprocating engine as claimed in Claim 4, wherein the EGR bypass temperature is controlled to create the desired excess of air for the combustion in the engine.

7. (currently amended) A method of supplying a reciprocating engine as claimed in Claim 4, wherein the EGR bypass temperature is controlled so that ~~the~~ a mass of ~~the~~ recycled gases remains substantially equal to ~~the~~ a mass of the fresh air up to the speed at which this temperature returns to the exhaust temperature, the recycled mass becoming greater than the mass of the fresh air above this speed.

8. (currently amended) A method of supplying a reciprocating engine as claimed in Claim 5, wherein the gas cooler is totally bypassed when the engine does not deliver propulsive power.

9. (currently amended) A method of supplying a reciprocating engine as claimed in Claim 8, wherein for cold starting and operating at idling speed, ~~the~~ an adjustment of ~~the~~ turbine valves ~~(6) and (7)~~ and/or ~~the~~ a timing of ~~the~~ engine valves is adjusted so that the excess of combustion air is minimal for ~~the~~ a desired level of depollution.

10. (currently amended) A reciprocating engine as claimed in Claim 1, wherein:

the adaptation speed Na is substantially equal to Nmin/2 so that ~~the~~ a volume of recycled gases is at least equal to that of the fresh air, and

the minimum temperature of the recycled gases is ~~preferably~~ close to the temperature of the fresh air so that ~~the~~ a mass of the recycled gases is at least equal to that of the fresh air at the minimum speed used Nmin in order to depollute during all ~~the~~ ranges of use of the engine.

11. (currently amended) A reciprocating engine as claimed in Claim 4, wherein:

the adaptation speed Na is substantially equal to Nmin/2 so that the volume of recycled gases is at least equal to that of the fresh air, and

the minimum temperature of the recycled gases is ~~preferably~~ close to the temperature of the fresh air so that ~~the~~ a mass of the recycled gases is at least equal to that of the fresh air at the minimum speed used Nmin in order to depollute during all ~~the~~ ranges of use of the engine.

12. (currently amended) A reciprocating engine as claimed in Claim 1,

wherein the turbocharging unit has a low-pressure LP turbocharger and a high-pressure HP turbocharger, ~~of which the~~ compressors of which work in series with~~,~~ ~~preferably,~~ a cooling of the air between the compressors and ~~the~~ an exhaust outlet section Sd ~~can be adjusted~~which is adjustable between a minimum Sd min and a maximum Sd max by one or a combination of the following~~-means~~:

- adjustment of ~~the~~ a variable section of ~~the~~ a gas distributor of the turbines,

- opening of a bypass between ~~the~~ an inlet and ~~the~~ an outlet of the turbines,

- passage from a series configuration to a parallel configuration of the turbines,

the turbocharging adaptation speed Na thus ~~becoming~~ being adjustable, in a continuous or discontinuous manner, between two values Na min and Na max. ~~In the following, a bypass between the inlet and the outlet of a turbine will be called a waste gate.~~

13. (currently amended) A reciprocating engine as claimed in Claim 12, wherein the minimum outlet section Sd min offered to the gases is formed by the two turbines mounted in series at maximum closure ~~if their distributor if variable and all waste gates are closed if they exist~~.

14. (currently amended) A reciprocating engine as claimed in Claim 13, which operates on a 4-stroke cycle with a fixed timing of ~~the~~ associated valves.

15. (currently amended) A reciprocating engine as claimed in Claim 14,

wherein the maximum outlet section Sd max offered to the gases is formed by the two turbines ~~with~~ which have fixed distributors mounted in parallel, and

wherein, in order to pass the turbines from the series configuration to the parallel configuration, the following manoeuvres ~~to be~~are carried out successively:

- progressive partial opening of an ~~the~~ HP waste gate between the inlet and the outlet of a turbine,

- progressive and simultaneous partial opening of the HP and an LP waste gates

- simultaneously and rapidly: total opening of the HP waste gate, total closure of the LP waste gate, putting the outlet of the HP turbine into communication with the outlet of the LP turbine.

16. (currently amended) A reciprocating engine as claimed in Claim 14,

wherein the maximum outlet section Sd max offered to the gases is formed by a LP turbine with fixed distributor and a HP turbine with variable distributor mounted in parallel, the HP distributor being fully open, and

wherein, in order to pass the turbines from the series configuration to the parallel configuration, the following manoeuvres to be carried out successively:

progressive opening of ~~the~~ a distributor of the HP turbine,

progressive partial opening of ~~the~~ an LP waste gate,

simultaneously and rapidly: total opening of the LP waste gate and putting the outlet of the HP turbine into communication with the outlet of the LP turbine.

17. (currently amended) A method of supplying a~~n~~ reciprocating engine as claimed in Claim 2,

wherein, in order to limit ~~the~~ a frequency of changing ~~the~~ a configuration, the geometry is ~~immobilised~~immobilized for a type of driving which implements a limited power range, ~~for example the series configuration of the turbines for driving in town and the parallel configuration for driving on the open road,~~ and ~~the~~ power thresholds corresponding to each configuration ~~can be~~are crossed for manoeuvres of short duration, ~~such as accelerating, overtaking, bursts of speed, etc.,~~ and

wherein the power thresholds may be crossed ~~as follows~~:

- by closure of the EGR valve ~~if the pressure in the exhaust manifold can be increased~~,

- by opening of one or two waste gates ~~if the exhaust temperature can be increased~~,

by closure of ~~the~~ an intake valve ~~if the maximum cycle pressure is reached or if the compressors are close to their maximum flow rate~~.

18. (currently amended) A method of supplying a~~n~~ reciprocating engine as claimed in Claim 3,

wherein, in order to limit ~~the~~ a frequency of changing ~~the~~ a configuration, the geometry is ~~immobilised~~immobilized for a type of driving which implements a limited power range, ~~for example the series configuration for driving in town and the parallel configuration for driving on the open road,~~ and ~~the~~ power thresholds corresponding to each configuration ~~can be~~are crossed for manoeuvres of short duration, ~~such as accelerating, overtaking, bursts of speed, etc.,~~ and

wherein the thresholds may be crossed ~~as follows~~:

- by closure of ~~the~~ an EGR valve ~~if the pressure in the exhaust manifold can be increased~~,

- by opening of one or two waste gates ~~if the exhaust temperature can be increased~~,

- by closure of ~~the~~ an intake valve ~~if the maximum cycle pressure is reached or if the compressors are close to their maximum flow rate~~.

19. (currently amended) A method of supplying ~~an~~ a reciprocating engine as claimed in Claim 12,

wherein, in order to limit ~~the~~ a frequency of changing ~~the~~ a configuration, the geometry is ~~immobilised~~immobilized for a type of driving which implements a limited power range, ~~for example the series configuration for driving in town and the parallel configuration for driving on the open road,~~ and ~~the~~ power thresholds corresponding to each configuration ~~can be~~are crossed for manoeuvres of short duration, ~~such as accelerating, overtaking, bursts of speed, etc.,~~ and

wherein the thresholds may be crossed ~~as follows~~:

- by closure of the EGR valve ~~if the pressure in the exhaust manifold can be increased~~,

- by opening of one or two waste gates ~~if the exhaust temperature can be increased~~,

- by closure of ~~the~~ an intake valve ~~if the maximum cycle pressure is reached or if the compressors are close to their maximum flow rate~~.

20. (currently amended) A reciprocating engine as claimed in Claim 15, wherein the LP waste gate has a second seat in order simultaneously to effect ~~the~~ a closure of the LP turbine inlet/outlet bypass and putting the HP turbine outlet into communication with the LP turbine outlet.

21. (currently amended) A reciprocating engine as claimed in Claim 15, wherein the two waste gates are concentric and have stops ~~in~~ such ~~a way~~ that ~~their~~ simultaneous movements thereof are actuated by one ~~of them~~ and communicated to the other by the ~~said~~ stops.

22. (currently amended) A reciprocating engine as claimed in Claim 14, wherein the maximum outlet section Sd max is formed by two turbines with fully open variable distributors mounted in series, and wherein the distributors are opened simultaneously

in order to maintain the intake pressure at ~~its~~ a maximum desired value thereof on ~~the~~ a full load curve.

23. (currently amended) A reciprocating engine as claimed in Claim 13,

wherein ~~the~~ a timing of ~~the~~ valves ~~can be~~ is controlled ~~so as~~ to displace ~~the~~ a closure of ~~the~~ an associated cylinder between the vicinity of the BDC and the mid-stroke of ~~the~~ an associated piston,

wherein the maximum outlet section Sd is formed by the HP turbine in series configuration ~~with the distributor fully open if it is variable, the HP waste gate fully open in the contrary case.~~; and

wherein the turbines are dimensioned ~~so as~~ to permit the compressors thereof to reach ~~their~~ maximum pressure ratios thereof simultaneously.

24. (currently amended) A method of supplying a~~n~~ reciprocating engine as claimed in Claim 23, wherein ~~the~~ a full load curve as a function of the speed is as follows:

from Nmin to 2 Nmin, ~~the~~ an intake closure FA passes from the BDC ~~(bottom dead centre)~~ to approximately 90 degrees of ~~the~~ a crankshaft after the BDC ~~in such a way as~~ to maintain ~~the~~ a cycle pressure below ~~its~~ a desired value thereof, and

~~the~~ a distributor or ~~the~~ an HP waste gate is closed;

from 2 Nmin to approximately 3 Nmin, the HP distributor or the HP waste gate is open ~~and possibly the LP waste gate in order~~ to maintain ~~the~~ an intake pressure at ~~its~~ a maximum desired value thereof, and

the intake closure FA is maintained at 90 degrees of the crankshaft after the BDC;~~,~~ and

from 3 Nmin to Nmax, ~~the~~ a global flow rate of fuel is kept constant ~~in order~~ to maintain the intake pressure at ~~its~~ a limiting value thereof, and

at partial load, ~~the~~ a timing of intake closure FA ~~will be~~ is controlled according to a map ~~memorised by~~ stored in ~~the~~ an engine control computer.

25. (currently amended) A reciprocating engine as claimed in Claim 13, which operates on the 2-stroke cycle, and wherein:

~~the~~ intake ports are closed by valves,

~~the~~ exhaust ports are closed by valves and communicate with one single exhaust manifold,

~~the~~ an external recycling phase precedes ~~the~~ scavenging,

~~the~~ a timing of the valves ~~can be~~is controlled ~~so as~~ to displace ~~the~~ a closure of ~~the~~ an associated cylinder between the vicinity of the BDC and the mid-stroke of ~~the~~ an associated piston,

~~the~~ a maximum outlet section Sd is formed by the HP turbine in series configuration~~ with the distributor fully open if it is variable, the HP waste gate fully open in the contrary case~~,

the turbines are dimensioned ~~so as~~ to permit ~~the~~ associated compressors to reach ~~their~~ maximum pressure ratios thereof simultaneously, and

the EGR ~~valve~~ bypass is ~~replaced by~~one of a check valve or a closable aerodynamic diode.

26. (currently amended) A method of supplying a~~n~~ reciprocating engine as claimed in Claim 25, wherein ~~the~~ a full load curve as a function of ~~the~~ speed is as follows:

- from Nmin to 2 Nmin, the closure of the cylinder passes from the BDC to approximately 90 degrees of the crankshaft after the BDC ~~in such a way as~~ to maintain ~~the~~ cycle pressure at ~~its~~ a desired value thereof,

- ~~the~~ a distributor or ~~the~~ an HP waste gate is closed,

- from 2 Nmin to approximately 3 Nmin, the HP distributor or the HP waste gate is open ~~and possibly the LP waste gate in order~~ to maintain ~~the~~ an intake pressure at ~~its~~ a maximum desired value thereof,

- an intake closure FA is maintained at 90 degrees of the crankshaft after the BDC,

- from 3 Nmin to Nmax, ~~the~~ a global flow rate of fuel is kept constant ~~in order~~ to maintain the intake pressure at ~~its~~ a limiting value thereof;~~,~~ and

wherein, in order to ~~maximise~~maximize ~~the~~ cooled external EGR, ~~the~~ depolluted partial loads ~~can be~~are effected as follows:

-the cylinder remains closed in the vicinity of the BDC and the turbines remain in closed configuration up to the compressor discharge pressure ~~P2~~ limit for this timing,

-the turbines are then opened in order to maintain the compressor discharge pressure ~~P2~~ at ~~its~~ a limiting value thereof,

-the aerodynamic diode is used when the external recycling flow stops.

27. (currently amended) A reciprocating engine as claimed in Claim 13, which operates on the 2-stroke cycle, ~~it has~~

wherein there are two exhaust ports per cylinder, closed by valves, which communicate respectively with an exhaust manifold connected to the turbine and an exhaust manifold connected to the EGR ~~conduit~~ bypass and/or to the turbine via a controlled distributor valve,

wherein ~~the~~ timing of the valve assigned to the EGR bypass ~~can be~~is controlled ~~so as~~ to displace the closure of the cylinder between the vicinity of the BDC and the mid-stroke of ~~the~~ an associated piston, wherein:

~~the~~ an external recycling phase precedes the scavenging when the cylinder closes in the vicinity of the BDC and follows ~~it~~ the scavenging when the cylinder closes at the mid-stroke of the piston;~~.~~

the maximum outlet section Sd is formed by the HP turbine in series configuration ~~with the distributor fully open if it is variable, the HP waste gate fully open in the contrary case.~~;

the turbines are dimensioned ~~so as~~ to permit the compressors to reach ~~their~~ maximum pressure ratios thereof simultaneously~~.~~; and

the EGR ~~valve~~ bypass is ~~replaced by~~one of a check valve or a closable aerodynamic diode.

28. (currently amended) A method of supplying a~~n~~ reciprocating engine as claimed in Claim 27, wherein:

the compressor discharge pressure ~~P2~~ is lower than ~~the~~ a limit allowed for the~~is~~ timing,

the distributor valve is in ~~the~~ a recycling position,

the cylinder is closed in the vicinity of the BDC,

~~the~~ a distributor or ~~the~~ an HP waste gate ~~are~~ is closed,

when the pressure reaches the limiting value allowed for this timing, the closure of the cylinder is displaced to the mid-stroke of the piston in order substantially to double the allowed compressor discharge pressure ~~P2~~ limit,

the distributor valve remains in the recycling position,

the distributor or the HP waste gate remains closed,

the compressor discharge pressure ~~P2~~ reaches ~~the~~ a new limit allowed for this new timing,

the distributor valve blocks the recycling,

the distributor or the HP waste gate opens in order to keep the compressor discharge pressure ~~P2~~ at ~~its~~ a new allowed limit thereof, and

the transition ~~can be~~is made by one of progressively in the two directions or rapidly with a hysteresis.

29. (currently amended) A method of supplying a reciprocating engine as claimed in Claim 6, wherein:

at full load the variable geometry is controlled ~~so as~~ to maintain a parameter at ~~its~~ a limiting desired value thereof;

at partial load the variable geometry is controlled ~~so as~~ to ~~optimise~~optimize ~~the~~ depollution and/or ~~the~~ performance according to a map ~~memorised~~stored in ~~the~~ an engine control computer.

30. (currently amended) A method of supplying a reciprocating engine as claimed in Claim 7, wherein:

at full load the variable geometry is controlled ~~so as~~ to maintain a parameter at ~~its~~ a limiting desired value thereof;

at partial load the variable geometry is controlled ~~so as~~ to ~~optimise~~optimize ~~the~~ depollution and/or ~~the~~ performance according to a map ~~memorised~~stored in ~~the~~ an engine control computer.

31. (currently amended) A method of supplying a reciprocating engine as claimed in Claim 8, wherein:

at full load the variable geometry is controlled ~~so as~~ to maintain a parameter at ~~its~~ a limiting desired value thereof;

at partial load the variable geometry is controlled ~~so as~~ to ~~optimise~~optimize ~~the~~ depollution and/or ~~the~~ performance according to a map ~~memorised~~stored in ~~the~~ an engine control computer.

32. (currently amended) A method of supplying a reciprocating engine as claimed in Claim 9, wherein:

at full load the variable geometry is controlled ~~so as~~ to maintain a parameter at ~~its~~ a limiting desired value thereof;

at partial load the variable geometry is controlled ~~so as~~ to ~~optimise~~optimize ~~the~~ depollution and/or ~~the~~ performance according to a map ~~memorised~~stored in ~~the~~ an engine control computer.

33. (currently amended) A method of supplying a reciprocating engine as claimed in Claim 17, wherein:

at full load the variable geometry is controlled ~~so as~~ to maintain a parameter at ~~its~~ a limiting desired value thereof;

at partial load the variable geometry is controlled ~~so as~~ to ~~optimise~~optimize ~~the~~ depollution and/or ~~the~~ performance according to a map ~~memorised~~stored in ~~the~~ an engine control computer.

34. (currently amended) A method of supplying a reciprocating engine as claimed in Claim 18, wherein:

at full load the variable geometry is controlled ~~so as~~ to maintain a parameter at ~~its~~ a limiting desired value thereof;

at partial load the variable geometry is controlled so as to ~~optimise~~optimize ~~the~~ depollution and/or ~~the~~ performance according to a map ~~memorised~~stored in ~~the~~ an engine control computer.

35. (currently amended) A method of supplying a reciprocating engine as claimed in Claim 19, wherein:

at full load the variable geometry is controlled ~~so as~~ to maintain a parameter at ~~its~~ a limiting desired value thereof;

at partial load the variable geometry is controlled ~~so as~~ to ~~optimise~~optimize ~~the~~ depollution and/or ~~the~~ performance according to a map ~~memorised~~stored in ~~the~~ an engine control computer.

36. (currently amended) A method of supplying a reciprocating engine as claimed in Claim 24, wherein:

at full load the variable geometry is controlled ~~so as~~ to maintain a parameter at ~~its~~ a limiting desired value thereof;

at partial load the variable geometry is controlled ~~so as~~ to ~~optimise~~optimize ~~the~~ depollution and/or ~~the~~ performance according to a map ~~memorised~~stored in ~~the~~ an engine control computer.

37. (currently amended) A method of supplying a reciprocating engine as claimed in Claim 26, wherein:

at full load the variable geometry is controlled ~~so as~~ to maintain a parameter at ~~its~~ a limiting desired value thereof;

at partial load the variable geometry is controlled ~~so as~~ to ~~optimise~~optimize ~~the~~ depollution and/or ~~the~~ performance according to a map ~~memorised~~stored in ~~the~~ an engine control computer.

38. (currently amended) A method of supplying a reciprocating engine as claimed in Claim 28, wherein:

at full load the variable geometry is controlled ~~so as~~ to maintain a parameter at ~~its~~ a limiting desired value thereof;

at partial load the variable geometry is controlled ~~so as~~ to ~~optimise~~optimize ~~the~~ depollution and/or ~~the~~ performance according to a map ~~memorised~~stored in ~~the~~ an engine control computer.

39. (currently amended) A reciprocating engine as claimed in Claim 1,

including a flat cylinder head bearing valves ~~of which the~~having faces on ~~the~~ a chamber side which are coplanar with the cylinder head and substantially tangent to ~~the~~ a cylinder,

wherein ~~the~~ an intake pipe or pipes terminate(s) ~~by~~ at an oblong nozzle defined by an upper half-cylinder resting on ~~the~~ an upper edge of ~~the~~ a conical seat and tangent to this ~~latter~~ seat along ~~its~~ a generating line thereof situated in a plane substantially perpendicular to ~~the~~ a plane passing through the axis of the seat and through ~~the~~ an axis of the cylinder and through a lower cylinder covering half of ~~the~~ a valve head opposite the ~~said~~ generating line,

wherein the nozzles are also oriented ~~so as~~ to create a tangential speed in ~~the~~ a same direction, and

wherein ~~the~~ angles of the seats are chosen ~~so as~~ to ~~optimise~~optimize ~~the~~ stratification of ~~the~~ a combustive charge.

40. (currently amended) A reciprocating engine as claimed in Claim 1,

including a flat cylinder head bearing valves ~~of which the~~having faces on ~~the~~ a chamber side which are coplanar with the cylinder head and substantially tangent to ~~the~~ a cylinder,

wherein ~~the~~ a conical sealing bearing surface of ~~the~~ intake valves is extended towards ~~the~~ a piston by a cylindrical part ~~of~~ having a height slightly greater than ~~the~~ a lift of the ~~said~~ valves,

wherein the conical sealing bearing surfaces ~~seats~~ of the ~~said~~ valves are disposed at ~~the~~ a bottom of cylindrical recesses provided in ~~the~~ a cylinder head in order to receive ~~the said~~ cylindrical parts of the ~~said~~ valves ~~in~~ such ~~a way~~ that ~~the~~ flat lower faces of the valves are in ~~the~~ a plane of the cylinder head when the~~y~~ lower faces rest on

the~~ir~~ associated seats thereof, ~~the~~ a clearance between the recesses and the valves being minimal, and

wherein the recesses are provided in the cylinder head ~~which~~ and do not go beyond the following boundaries:

- two cylindrical portions concentric with ~~the~~ a bore and tangent externally and internally to the cylindrical recess of each valve,

- a conical surface extending ~~the~~ a half-seat of the valve delimited by a plane passing through ~~the~~ an axis thereof and ~~the~~ an axis of the cylinder;~~,~~

wherein the recesses ~~will~~ are also ~~be~~ oriented ~~so as~~ to create a tangential velocity in ~~the~~ a same direction, and

wherein ~~the~~ an angle of the seats is chosen ~~so as~~ to ~~optimise~~optimize ~~the~~ a stratification of ~~the~~ a combustive charge.

41. (currently amended) A reciprocating engine as Claimed in Claim 39, ~~wherein it includes~~including two diametrically opposed intake valves.

42. (currently amended) A reciprocating engine as Claimed in Claim 40, including ~~wherein it includes~~ two diametrically opposed intake valves.

43. (currently amended) A reciprocating engine as claimed in Claim 1, wherein:

a fraction of the recycled gases is retained in ~~the~~ a cylinder at ~~the~~ a closure of the ~~latter~~cylinder,

the fresh gases are introduced by directive intake conduits ~~with the aim of organising~~to create a stratification of ~~the~~ temperatures and ~~the~~ concentrations in ~~the~~ a chamber at the combustion top dead centre, and

~~the~~ a fuel is ~~vaporised~~vaporized in the fresh gases.

44. (currently amended) A reciprocating engine as claimed in Claim 43, wherein the fuel is introduced into the ~~pure~~ fresh air between the compressor and ~~the~~ an external EGR mixer.

45. (currently amended) A reciprocating engine as claimed in Claim 43, wherein the fuel is introduced into ~~the~~ a mixture between the pure air and ~~the~~ an external EGR.

46. (currently amended) A reciprocating engine as claimed in Claim 43, wherein ~~the~~ an ignition point is controlled by ~~the~~ a timing of ~~the~~ valves at the closure of the cylinder.

47. (currently amended) A reciprocating engine as claimed in Claim 43, wherein ~~the~~ an ignition point is controlled by ~~the~~ a temperature of ~~the~~ an external EGR.

48. (currently amended) A reciprocating engine as claimed in Claim 43, wherein ~~the~~ a first ignition is controlled electrically or is triggered spontaneously by ~~the~~ an injection of the fuel at high pressure at the top dead centre.

49. (currently amended) A reciprocating engine as claimed in Claim 43, wherein:

~~the~~ a working chamber of the gases has a geometry revolving around ~~the~~ an axis of the cylinder;~~,~~

the stratification has a geometry revolving around the axis of the cylinder and created by ~~the~~ an orientation of ~~the~~ intake ports, and

the temperature of ~~the~~ a combustive charge increases between ~~the~~ a periphery and the axis so that ~~the~~ a self-ignition is propagated from ~~the~~ a centre towards ~~the~~ a periphery.

50. (currently amended) A reciprocating engine as claimed in Claim 49, wherein ~~the~~ a meridian profile of the combustion chamber is chosen ~~so as~~ to ~~optimise~~optimize ~~the~~ a rate of release of energy by ~~the~~ a progressiveness of ~~the~~ isothermal surfaces of ~~the~~ a reactive load.

51. (new) A reciprocating engine as claimed in Claim 14,

wherein the maximum outlet section Sd max offered to the gases is formed by the two turbines which have fixed distributors mounted in parallel, and

wherein, in order to pass the turbines from the series configuration to the parallel configuration, the following manoeuvres are carried out simultaneously and with rapidity:

- total opening of an HP waste gate,
- total closing of an LP waste gate,
- putting the outlet of the HP turbine into communication with the outlet of the LP turbine.